

Type 11:

Small, organic substrate-dominated rivers

Distribution in river landscapes and regions according to Briem (2003):

Ecoregion independent stream type. Old and young moraine landscapes (ground and terminal moraines); outwash plains and sandy deposits; river terraces (including lower river terraces); mires; occasionally in upper reaches of streams in basement and overlying mountains; large floodplains of the alpine foot hills (over 300m wide).

Picture:



Stollbach (North Rhine-Westphalia). Photograph: M. Sommerhäuser

Short description of morphology:

Sinuate channel form in a clearly defined u-shaped valley, with a tendency to form multiple channels (anabranches) and side channels.

The very shallow channel is barely cut in. The substrates can be composed completely of organic matter (peat, wood, coarse and fine detritus). Streams are rich in macrophytes. Humic substances often colour the water brown ("black water streams"). The water level at medium discharge is just below ground level throughout much of the year. The minimal entrenchment allows for a strong connectivity between river and floodplain; at elevated water levels the entire floodplain is inundated.

Especially in young moraine landscapes, higher levels of mineral substrate can occur in the channel. Over short stretches the bed can be purely mineral.

Abiotic profile:

Size class: 10 - 100 km² catchment area

Slope of the valley floor: 2 - 15 ‰

Flow category: regular alternation between calmly flowing stretches with more turbulent flow behind coarse woody debris accumulations or root barriers.

Channel substrates: predominantly organic substrates (peat, fallen leaves, coarse woody debris, macrophytes); mineral substrates (sand and gravel) are subordinate.

Physico-chemical water conditions:

Organic streams; depending on catchment geology, physical and chemical characteristics exhibit different ranges for base-rich or base-poor variants.

	base-poor	base-rich
Conductivity [$\mu\text{S}/\text{cm}$]:	350 - 500	350 - 800
pH-value:	6,5 - 7,5	7,5 - 8,0
Alkalinity [$^{\circ}\text{dH}$]:	3 - 6	~ 16
Total hardness [$^{\circ}\text{dH}$]:	6 - 11	~ 25

Flow regime & hydrology:

Medium to high seasonal fluctuation in discharge; summer drying is common in small streams.

Type 11:

Small, organic substrate-dominated rivers

Characterisation of the macroinvertebrate community:

Functional groups: Typical for this stream type is the dominance of plant dwelling species, which colonise floating macrophytes, aquatic moss, and flooded grass in high densities. Sediment and detritus feeders collect food in fine organic channel substrates and between dense macrophyte stands. The proximity to springs and the usually small size of streams is reflected in the high portion of hypocrenal and rhithral species. Besides these, lenitic species are also common.

Selection of type-specific species: These include the caddis flies *Oligostomis reticulata*, *Trichostegia minor*, *Hydatophylax infumatus* and *Micropeterna lateralis* as well as the black fly *Simulium urbanum*. Accompanying species include dragonflies and stoneflies (*Cordulegaster boltoni*, *Aeshna cyanea*, *Pyrrhosoma nymphula*, *Leuctra nigra*, *Nemoura* spec.).

Interesting is the disappearance of many species and taxa in base-poor variants due to dystrophic and carbonate-poor habitat conditions. These include Gammarids (except *Niphargus* spec.), mayflies, many molluscs and Turbellaria.

In base-rich variants, less extreme abiotic conditions allow for a more diverse biocoenosis. Besides demanding species like the caddis fly *Sericostoma personatum*, euryoecious species can be abundant.

Characterisation of macrophyte and pyhtobenthos communities:

Older moraines: species, which can form large stands like *Potamogeton polygonifolius*, *Isolepis fluitans*, *Scapania undulate* are common; numerous species of *Sphagnum* spec. also occur.

Younger moraines: submerged macrophytes are largely absent; locally there are flooded stands of reed; in amphibious zones swamp forest species, reeds and sedge swamp and spring species occur.

Characterisation of the fish fauna:

The ecoregion independent distribution of the stream type is reflected in the fish fauna. A generally valid description of the fish fauna is not possible. In base-poor variants of the stream type a stable community with belica (*Leucaspis delineatus*) and nine-spine stickleback (*Pungitius pungitius*) is supported. Other species largely absent.

Comments:

Typical for this stream type are humic substances, which often colour the water brown.

Possible confusion with other stream types: Confusion with other stream types is unlikely in near-natural conditions. Strongly degraded organic streams can resemble small sand-dominated lowland rivers. In contrast to stream type 19 (streams in riverine floodplains), type 14 streams have a clearly discernible valley form and a steeper stream slope. Organic streams are also "independent" from other larger streams into which they flow, and are not hydrologically influenced by them. Faunistically, type 11 streams are characterised by stream and riparian species, while in type 19, streams are dominated by lenitic species.

Notice: The description of this stream type may be supplemented with results from currently running research projects.

Examples of typical streams

Macroinvertebrates: Stollbach (North Rhine-Westphalia)

Macrophytes and pyhtobenthos: Wümme (Lower Saxony), Schaagbach (Lower Saxony)

Comparative literature (selection):

LUA NRW (1999) „Organisch geprägtes Fließgewässer der Sander und sandigen Aufschüttungen“, TIMM & SOMMERHÄUSER (1993) „Organischer Bach“, RASPER (2001) „Organisch geprägtes Fließgewässer des Tieflandes (mit Börden)“, LUA BB (2001) „Organischer Bach der jungglazialen Senken und Urstromtäler“, SOMMERHÄUSER & SCHUHMACHER (2003)